AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

Claim 1 (Currently amended): A method for producing a recombinant glycoprotein in a uni- or multicellular fungal host cell which includes an α-1,2-mannosidase activity and a GlcNAc transferase I (GnT I) activity and is diminished or depleted in the activity of an initiating α-1,6-mannosyltransferase ~~and which produces N-glycans comprising GlcNAcMan5GlcNAc2 structures~~, the method comprising the step of expressing in the host cell a nucleic acid encoding a chimeric mannosidase enzyme comprising

(a) a *D. melanogaster* mannosidase II catalytic domain fused to a cellular targeting signal peptide selected from the group consisting of Gls1-s, Mns1-s, Mns1-m, S.Sec-s, S.Sec-m, S.Sec-l, P.Sec-s, P.Sec-m, Mnn9-s, Van1-s, Van1-m, Van1-l, Anp1-s, Anp1-m, Anp1-l, Hoc1-s, Hoc1-m, Hoc1-l, Mnn10-m, Mnn11-s, Mnt1-m, J3-m, Ktr1-s, Ktr2-s, Gnt1-s, Gnt1-m, Gnt1-l, Mnn2-s, Mnn2-m, Mnn2-l, Mnn5-m, Mnn1-s, Mnn1-m, Mnn1-l, Mnn6-s, and Mnn6-m or

(b) a *C. elegans* mannosidase II catalytic domain fused to a cellular targeting signal peptide selected from the group consisting of Gls1-s, Mns1-s, Mns1-m, S.Sec-s, S.Sec-m, S.Sec-l, P.Sec-s, Van1-s, Van1-m, Van1-l, Anp1-s, Hoc1-m, Mnn10-s, Mnn10-m, Mnn10-l, Mnn11-s, Mnn11-m, Mnt1-s, Mnt1-m, Mnt1-l, D2-s, D2-m, D9-m, J3-m, Ktr2-s, Gnt1-s, Gnt1-m, Mnn2-s, Mnn2-m, Mnn2-l, Mnn5-s, Mnn5-m, Mnn1-s, Mnn1-m, and Mnn6-m, wherein said chimeric ~~enzyme~~ mannosidase in (a) or (b) is capable of hydrolyzing *in vivo* more than 40-50 percent of the Man α-1,3 and/or Man α-1,6 linkages of a GlcNAcMan5GlcNAc2 oligosaccharide substrate,

whereby expression of said chimeric mannosidase produces one or more ~~desired N-glycan~~ *N*-glycan structures on a recombinant glycoprotein expressed in said host cell wherein the ~~desired N-glycan~~ *N*-glycan is characterized as having at least the oligosaccharide branch Manα1,3 (Manα1,6) Manβ1,4-GlcNAc β1,4-GlcNAc-Asn.

Claim 2 (Currently amended): A method for producing a recombinant glycoprotein in a uni- or multicellular fungal host cell which includes an α-1,2-mannosidase and a GlcNAc transferase I (GnT I) and is diminished or depleted in the activity of an initiating α-1,6-mannosyltransferase ~~and which produces N-glycans comprising GlcNAcMan5GlcNAc2 structures~~, the method comprising the step of expressing in the host cell a nucleic acid encoding a chimeric mannosidase enzyme comprising

(a) a *D. melanogaster* mannosidase II catalytic domain fused to a cellular targeting signal peptide selected from the group consisting of Gls1-s, Mns1-s, Mns1-m, S.Sec-s, S.Sec-m, S.Sec-l, P.Sec-s, P.Sec-m, Mnn9-s, Van1-s, Van1-m, Van1-l, Anp1-s, Anp1-m, Anp1-l, Hoc1-s, Hoc1-m, Hoc1-l, Mnn10-m, Mnn11-s, Mnt1-m, J3-m, Ktr1-s, Ktr2-s, Gnt1-s, Gnt1-m, Gnt1-l, Mnn2-s, Mnn2-m, Mnn2-l, Mnn5-m, Mnn1-s, Mnn1-m, Mnn1-l, Mnn6-s, and Mnn6-m or

(b) a *C. elegans* mannosidase II catalytic domain fused to a cellular targeting signal peptide selected from the group consisting of Gls1-s, Mns1-s, Mns1-m, S.Sec-s, S.Sec-m, S.Sec-l, P.Sec-s, Van1-s, Van1-m, Van1-l, Anp1-s, Hoc1-m, Mnn10-s, Mnn10-m, Mnn10-l, Mnn11-s, Mnn11-m, Mnt1-s, Mnt1-m, Mnt1-l, D2-s, D2-m, D9-m, J3-m, Ktr2-s, Gnt1-s, Gnt1-m, Mnn2-s, Mnn2-m, Mnn2-l, Mnn5-s, Mnn5-m, Mnn1-s, Mnn1-m, and Mnn6-m, wherein said chimeric ~~enzyme~~ mannosidase in (a) and (b) is capable of hydrolyzing *in vivo* more than 40-50 percent of the Man α-1,3 and/or Man α-1,6 linkages of a GlcNAcMan5GlcNAc2 oligosaccharide substrate,

whereby expression of said chimeric mannosidase produces one or more ~~desired N-glycan~~ *N*-glycan structures on a recombinant glycoprotein expressed in said host cell, wherein the ~~desired N-glycan~~ *N*-glycan is produced within the host cell at a yield of at least 10 mole percent and wherein the ~~desired N-glycan~~ *N*-glycan is characterized as having at least the oligosaccharide branch Manα1,3 (Manα1,6) Manβ1,4-GlcNAc β1,4-GlcNAc-Asn.

Claims 3-5 (Cancelled)

Claim 6 (Original): The method of claim 1 or 2, wherein the oligosaccharide substrate is characterized as Manα1,3 (Manα1,6 Manα1,6) Manβ1,4-GlcNAc β1,4-GlcNAc-Asn; Manα1,3 (Manα1,3 Manα1,6) Manβ1,4-GlcNAc β1,4-GlcNAc-Asn; GlcNAcβ1,2 Manα1,3 (Manα1,6 Manα1,6) Manβ1,4-GlcNAc β1,4-GlcNAc-Asn; GlcNAcβ1,2 Manα1,3 (Manα1,3 Manα1,6)

Manβ1,4-GlcNAc β1,4-GlcNAc-Asn; Manα1,3 (Manα1,3 Manα1,6 Manα1,6) Manβ1,4-GlcNAc β1,4-GlcNAc-Asn; GlcNAcβ1,2 Manα1,3 (Manα1,3 Manα1,6 Manα1,6) Manβ1,4-GlcNAc β1,4-GlcNAc-Asn; Manα1,2 Manα1,3 (Manα1,3 Manα1,6 Manα1,6) Manβ1,4-GlcNAc β1,4-GlcNAc-Asn; Manα1,2 Manα1,3 (Manα1,3 Manα1,6) Manβ1,4-GlcNAc β1,4-GlcNAc-Asn; Manα1,2 Manα1,3 (Manα1,6 Manα1,6) Manβ1,4-GlcNAc β1,4-GlcNAc-Asn or high mannan.

Claim 7-9 (Cancelled)

Claim 10 (Currently amended): The method of claim 1 or 2, wherein the chimeric mannosidase comprises a Class IIx mannosidase catalytic domain fused to a cellular targeting signal peptide that targets the chimeric ~~enzyme~~ mannosidase to the secretory pathway of the host cell.

Claim 11 (Previously presented) : The method of claim 10, wherein the Class IIx mannosidase enzyme has a substrate specificity for Manα1,3 (Manα1,6 Manα1,6) Manβ1,4-GlcNAc β1,4-GlcNAc-Asn; Manα1,3 (Manα1,3 Manα1,6) Manβ1,4-GlcNAc β1,4-GlcNAc-Asn; or Manα1,2 Manα1,3 (Manα1,3 Manα1,6 Manα1,6) Manβ1,4-GlcNAc β1,4-GlcNAc-Asn.

Claim 12 (Currently amended): The method of claim 1 or 2, wherein the chimeric mannosidase enzyme comprises a Class III mannosidase catalytic domain fused to a cellular targeting signal peptide that targets the chimeric ~~enzyme~~ mannosidase to the secretory pathway of the host cell.

Claim 13 (Currently amended) : The method of claim 12, wherein the Class III mannosidase enzyme has a substrate specificity for Manα1,3 (Manα1,6 Manα1,6) Manβ1,4-GlcNAc β1,4-GlcNAc-Asn; Manα1,3 (Manα1,3 Manα1,6) Manβ1,4-GlcNAc β1,4-GlcNAc-Asn; Manα1,3 (Manα1,3 Manα1,6 Manα1,6) Manβ1,4-GlcNAc β1,4-GlcNAc-Asn; or high mannans.

Claim 14 (Currently amended) : The method of claim 1 or 2, wherein the chimeric mannosidase enzyme is overexpressed.

Claim 15 (Currently amended) : The method of claim 1 or 2, wherein the chimeric mannosidase enzyme is further capable of hydrolyzing a Manα1,2 linkage.

Claim 16 (Currently amended) : The method of claim 1 or 2, wherein the chimeric mannosidase enzyme has a pH optimum of from about 5.0 to about 8.0.

Claim 17 (Canceled)

Claim 18 (Currently amended) : The method of claim 1 or 2, wherein the chimeric mannosidase enzyme is localized within the secretory pathway of the host cell.

Claim 19 (Currently amended) : The method of claim 1 or 2, wherein the chimeric mannosidase enzyme is localized within at least one of the ER, Golgi apparatus or the trans Golgi network of the host cell.

Claims 20-25 (Cancelled)

Claim 26 (Original): The method of claim 1 or 2, further comprising the step of isolating the glycoprotein from the host cell.

Claim 27 (Original) : The method of claim 1 or 2, wherein the host cell is selected from the group consisting of *Pichia pastoris, Pichia finlandica, Pichia trehalophila, Pichia koclamae, Pichia membranaefaciens, Pichia opuntiae, Pichia thermotolerans, Pichia salictaria, Pichia guercuum, Pichia pijperi, Pichia stiptis, Pichia methanolica, Pichia sp., Saccharomyces cerevisiae, Saccharomyces sp., Hansenula polymorpha, Kluyveromyces sp., Kluyveromyces lactis, Candida albicans, Aspergillus nidulans, Aspergillus niger, Aspergillus oryzae, Trichoderma reesei, Chrysosporium lucknowense, Fusarium sp., Fusarium gramineum, Fusarium venenatum* and *Neurospora crassa.*

Claim 28 (Original) : The method of claim 27, wherein the host cell is *Pichia pastoris.*

Claim 29 (Original) : The method of claim 1 or 2, wherein the glycoprotein is a therapeutic protein.

Claim 30 (Original) : The method of claim 29, wherein the therapeutic protein is selected from the group consisting of erythropoietin, cytokines, coagulation factors, soluble IgE receptor α-chain, IgG, IgG fragments, IgM, interleukins, urokinase, chymase, urea trypsin inhibitor, IGF-

binding protein, epidermal growth factor, growth hormone-releasing factor, annexin V fusion protein, angiostatin, vascular endothelial growth factor-2, myeloid progenitor inhibitory factor-1, osteoprotegerin, α-1-antitrypsin and α - feto protein.

Claims 31 – 56 (Cancelled)

Claim 57 (Currently amended) : The method of claim 1, wherein the ~~desired N-glycan~~ *N*-glycan comprises an oligosaccharide structure selected from the group consisting of $Man_3GlcNAc_2$, $GlcNAcMan_3GlcNAc_2$, and $Man_4GlcNAc_2$.

Claim 58 (Currently amended): The method of claim 2, wherein the ~~desired N-glycan~~ *N*-glycan comprises an oligosaccharide structure selected from the group consisting of $Man_3GlcNAc_2$, $GlcNAcMan_3GlcNAc_2$, and $Man_4GlcNAc_2$.

Claim 59 (New): A method for producing a recombinant glycoprotein in a yeast host cell comprising:

(a) expressing a nucleic acid encoding the recombinant glycoprotein in a yeast host cell that is diminished or depleted in the activity of an initiating α-1,6-mannosyltransferase and expresses an α-1,2-mannosidase activity, a GlcNAc transferase I (GnT I) activity, and a chimeric mannosidase enzyme comprising

(i) a *D. melanogaster* mannosidase II catalytic domain fused to a cellular targeting signal peptide selected from the group consisting of Gls1-s, Mns1-s, Mns1-m, S.Sec-s, S.Sec-m, S.Sec-l, P.Sec-s, P.Sec-m, Mnn9-s, Van1-s, Van1-m, Van1-l, Anp1-s, Anp1-m, Anp1-l, Hoc1-s, Hoc1-m, Hoc1-l, Mnn10-m, Mnn11-s, Mnt1-m, J3-m, Ktr1-s, Ktr2-s, Gnt1-s, Gnt1-m, Gnt1-l, Mnn2-s, Mnn2-m, Mnn2-l, Mnn5-m, Mnn1-s, Mnn1-m, Mnn1-l, Mnn6-s, and Mnn6-m or

(ii) a *C. elegans* mannosidase II catalytic domain fused to a cellular targeting signal peptide selected from the group consisting of Gls1-s, Mns1-s, Mns1-m, S.Sec-s, S.Sec-m, S.Sec-l, P.Sec-s, Van1-s, Van1-m, Van1-l, Anp1-s, Hoc1-m, Mnn10-s, Mnn10-m, Mnn10-l, Mnn11-s, Mnn11-m, Mnt1-s, Mnt1-m, Mnt1-l, D2-s, D2-m, D9-m, J3-m, Ktr2-s, Gnt1-s, Gnt1-m, Mnn2-s, Mnn2-m, Mnn2-l, Mnn5-s, Mnn5-m, Mnn1-s, Mnn1-m, and Mnn6-m

wherein said chimeric mannosidase in (a) or (b) is capable of hydrolyzing *in vivo* more than 40-50 percent of the Man α-1,3 and/or Man α-1,6 linkages of a $GlcNAcMan_5GlcNAc_2$ oligosaccharide substrate and wherein the recombinant glycoprotein expressed in said host cell comprises *N*-glycans characterized as having at least the oligosaccharide branch Manα1,3 (Manα1,6) Manβ1,4-GlcNAc β1,4-GlcNAc-Asn; and

(b) isolating the recombinant glycoprotein.

Claim 60 (New): The method of claim 59, wherein the chimeric mannosidase comprises a Class IIx mannosidase catalytic domain fused to a cellular targeting signal peptide that targets the chimeric mannosidase to the secretory pathway of the host cell.

Claim 61 (New): The method of claim 10, wherein the Class IIx mannosidase enzyme has a substrate specificity for Manα1,3 (Manα1,6 Manα1,6) Manβ1,4-GlcNAc β1,4-GlcNAc-Asn; Manα1,3 (Manα1,3 Manα1,6) Manβ1,4-GlcNAc β1,4-GlcNAc-Asn; or Manα1,2 Manα1,3 (Manα1,3 Manα1,6 Manα1,6) Manβ1,4-GlcNAc β1,4-GlcNAc-Asn.

Claim 62 (New): The method of claim 1 or 2, wherein the chimeric mannosidase enzyme comprises a Class III mannosidase catalytic domain fused to a cellular targeting signal peptide that targets the chimeric mannosidase to the secretory pathway of the host cell.

Claim 63 (New) : The method of claim 12, wherein the Class III mannosidase enzyme has a substrate specificity for Manα1,3 (Manα1,6 Manα1,6) Manβ1,4-GlcNAc β1,4-GlcNAc-Asn; Manα1,3 (Manα1,3 Manα1,6) Manβ1,4-GlcNAc β1,4-GlcNAc-Asn; Manα1,3 (Manα1,3 Manα1,6 Manα1,6) Manβ1,4-GlcNAc β1,4-GlcNAc-Asn; or high mannans..

Claim 64 (New) : The method of claim 1 or 2, wherein the yeast host cell is selected from the group consisting of *Pichia pastoris, Pichia finlandica, Pichia trehalophila, Pichia koclamae, Pichia membranaefaciens, Pichia opuntiae, Pichia thermotolerans, Pichia salictaria, Pichia guercuum, Pichia pijperi, Pichia stiptis, Pichia methanolica, Pichia sp., Saccharomyces cerevisiae, Saccharomyces sp., Hansenula polymorpha, Kluyveromyces sp., Kluyveromyces lactis,* and *Candida albicans*..

Claim 65 (New) : The method of claim 64, wherein the yeast host cell is *Pichia pastoris*.

Claim 66 (New) : The method of claim 59, wherein the recombinant glycoprotein is a therapeutic protein.

Claim 67 (New) : The method of claim 66, wherein the therapeutic protein is selected from the group consisting of erythropoietin, cytokines, coagulation factors, soluble IgE receptor α-chain, IgG, IgG fragments, IgM, interleukins, urokinase, chymase, urea trypsin inhibitor, IGF-binding protein, epidermal growth factor, growth hormone-releasing factor, annexin V fusion protein, angiostatin, vascular endothelial growth factor-2, myeloid progenitor inhibitory factor-1, osteoprotegerin, α-1-antitrypsin and α - feto protein.